

MECHANICAL TRANSLATION OF LANGUAGES

A SPECIAL SUBJECT LIST

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Introduction:

The language barrier to the free interchange of knowledge is a difficult one to overcome, and it is particularly frustrating to scientists and technologists, who need to keep abreast of published work in all the major languages, if they are to be sufficiently well informed about the newest discoveries all over the world in their special fields of interest to avoid needless duplication of work already done. It is still true that over half of the world's output of scientific and technical papers is published in English, but this percentage is falling all the time. The major European languages have long had their own voluminous literatures, while the importance of the output in Russian, Chinese and other Asiatic languages is growing and will grow as their parent countries become increasingly industrialised. The third edition of the "World List of Scientific Periodicals", published in 1952, listed over 50,000 titles of journals in being over the first half of the present century, and this total is likely to increase as literacy and the spread of technology advance hand in hand. The difficulties of translating such a spate of material are great, particularly as each branch of science and technology has a specialised vocabulary of its own which is unintelligible to anyone who is not himself a trained member of that branch. The number of expert linguists capable of doing this work is just not sufficient to meet the demand, and so it was inevitable that men should begin to dream of some machine which would do the job for them.

The first recorded suggestion as to the possibility of adapting electronic computers to translate from one language to another was expressed by A.D. Booth of Birkbeck College in a report in 1946. This tentative opinion attracted the attention of Warren Weaver of the Rockefeller Foundation to such a degree that he was instrumental in arranging for Booth to carry out research on the project at the Princeton Institute of Advanced Study. His work there in

the following year with D.H.V. Britten resulted in the report which forms Item 14 below. In July, 1949, interest in the possibilities of mechanical translation was greatly stimulated by the circulation of the memorandum "Translation" (Item 45 below) by Warren Weaver to some 200 of his friends. It resulted in further exploratory projects being initiated with Rockefeller Foundation support at the Massachusetts Institute of Technology, the University of California and the University of Washington, associated with the names of Bar-Hillel, Oswald and Fletcher, and Reifler respectively. Interest was sufficient by 1952 to warrant the organization of a conference on the subject, and since then work has proceeded steadily in America, in England at Birkbeck College Electronic Computation Laboratory under Booth with the assistance of a Nuffield Foundation grant, and in Russia.

The difficulties to be overcome in devising machines capable of translating from one language to another are, of course, immense. In addition to the vast mechanical dictionary which will serve as the major part of the machine's memory, some means will have to be formulated to take into account both the syntax of the original language and the corresponding grammatical idiosyncracies of the target language into which it is to be translated. Word-for-word translation is the first stage at which practical experiments have been directed, and limited successes have been achieved with machines like the I.B.M. 701, the "Whirlwind" and the B.E.S.M. Sentence-for-sentence translation, in which not only the actual words, but the intrinsic ideas and aesthetic values of the original text, are reproduced faithfully and instantaneously, must await the development of machines which are more than mere mechanical dictionaries. Much intensive work has been done and is being done on the theoretical side of analysing and breaking down the syntax of various languages, collecting data on word-frequency, tense endings, word order and the like, which it is one day hoped to build into translating machine designs. The names of Yngve, Locke, Kaplan and Harper are prominent in this work, in addition to those already mentioned.

The fact that much of the early material on the subject was only in typewritten or duplicated form has been overcome to some extent by the making available on microfilm of some thirteen of the more important basic contributions (see Item 30 below), and by the fact that expanded and amended versions of other of these early texts have been published as sections in "Machine Translation of Languages" (Item 25 below). Where other material has appeared in more than one format, it has been listed under the one considered to be the more readily accessible to the normal run of readers. Anyone who makes a study of the two important composite works listed above, and supplements this with the perusal of any copies of "Mechanical Translation" (Item 26 below), cannot fail to be intrigued by the horizons which will be opened up if, and when, this modern counterpart of the Philosopher's Stone of the alchemists is finally an accomplished fact.

PAPERS PRESENTED AT THE FIRST CONFERENCE ON MECHANICAL TRANSLATION held at the Massachusetts Institute of Technology, June 17th - 20th, 1952.

1. BAR-HILLEL, Y. Mechanical translation: needs and possibilities, 6pp, typescript.

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2. BAR-HILLEL, Y. Operational grammar, 11pp, typescript.
3. BAR-HILLEL, Y. The treatment of idioms by a translating machine, 8pp, typescript.
4. BULL, W.F. Problems of vocabulary frequency and distribution, 8pp, mimeographed.
5. DODD, S.C. Model English for mechanical translation, 9pp, mimeographed.
6. HELMER, O. The structure of the problem of mechanical translation, 1p, abstract, mimeographed (Full text not available).
7. OSWALD, V.A. Microsemantics, 10pp, mimeographed.
8. OSWALD, V.A. Word-by-word translation, 7pp, mimeographed.
9. PERRY, J.W. Machine techniques for index searching and for mechanical translation, 9pp, mimeographed.
10. REIFLER, E. General mechanical translation and universal grammar, 6pp, mimeographed (Studies in Mechanical Translation, No. 4).
11. REIFLER, E. Mechanical translation with a pre-editor and writing for mechanical translation, 16pp, mimeographed (Studies in Mechanical Translation, No. 3).
12. RICHENS, R.H. and BOOTH, A.D. Some methods of mechanical translation, 31pp, mimeographed.

BOOKS and SEPARATELY PUBLISHED DOCUMENTS

13. BEACH, A.F. and others. Bibliography on the use of I.B.M. machines in science, statistics and education. New York, International Business Machines, 1954, 54pp, no price.
14. BOOTH, A.D. Report to the Rockefeller Foundation on the proposed London electronic computer. Princeton, 1947, no price. An account of the work done in 1947 by A.D. Booth and D.H.V. Britten at the Institute of Advanced Study, Princeton.
15. BOOTH, A.D. and K.H.V. Automatic digital calculators, 2nd ed., 1956, Butterworths, 261pp, 32/-. Section dealing with mechanical translation pp. 221-224.
16. BOOTH, A.D. and others. Mechanical resolution of linguistic problems. Butterworths (In press).
17. CECCATO, S. La grammatica insegnata alle macchine (Grammar taught to machines) Reprinted from Civitta delle Macchine, 1956, Nos. 1 and 2, Societa Finanziaria Meccanica, Rome, 27pp, L.2800 (In Italian, with English summaries).

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18. DODD, S.C. Model English for mechanical translation, Washington Public Opinion Laboratory, 10pp, no price.
19. GOURDON, R.L. Verfahren und Vorrichtung zur Selbsttätigen Vollständigen und Augenblicklichen Übersetzung von Schriftstücken in Verschiedene Sprachen (Process and system for the automatic and instantaneous translation of documents in several languages). German Patent 911,187 granted May, 10th, 1954 for a mechanical and optical device claiming to perform word-for-word translations.
20. GREENIAS, E.C. The design of a logic for the recognition of printed characters, New York, International Business Machines, 1956, 34pp, no price.
21. HOLMSTROM, J.E. U.N.E.S.C.O. Report on technical translating and related problems. 1st draft, Paris, August 15th, 1953, 196pp, no price. Section 2.1 deals with mechanical translation.
22. HOLT, C.C. Proposals for an electronic translating machine with microfilm memory, January 1954, 4pp, typescript, no price.
23. IVALL, T.E. (Editor) Electronic computers: principles and applications. Iliffe, 1956, 167pp, 25/-. Section dealing with mechanical translation pp. 139-143.
24. KAPLAN, A. An experimental study of ambiguity in context. November 30, 1950, 18pp, mimeographed, no price.
25. LOCKE, W.N. and BOOTH, A.D. (Editors). Machine translation of languages Chapman and Hall, 1955, 239pp, 48/-. Collection of 14 essays on all aspects of mechanical translation by 17 authorities in the field. Many of the essays are revised and expanded versions of papers delivered at the First Conference on Mechanical Translation. This book is the first full-length treatment of the topic.
26. MECHANICAL TRANSLATION. Journal devoted to the translation of languages with the aid of machines, edited by V.H. Yngve and W.N. Locke, published by the Massachusetts Institute of Technology since March 1954, 3 copies per annum usually. Contains news of new work and conferences in the field, original articles, and abstracts of work published elsewhere.
27. MOOERS, C.N. Machines for information retrieval, learning and translation. June, 1952, 2pp, mimeographed, no price.
28. MUKHIN, I.S. An experiment on the machine translation of languages carried out on the B.E.S.M. Moscow, U.S.S.R. Academy of Sciences, 1956, 28pp, no price. Describes a Russian machine capable of translating 952 English words.
29. OMTTINGER, A.G. A study for the design of an automatic dictionary. Harvard University Doctoral Thesis, April 1954. A summarised version of this thesis forms chapter 3 of "Machine Translation of Languages" (Item 25 above).

30. PAPERS ON MECHANICAL TRANSLATION. Microfilm Roll 799 of Micro-reproduction Service, 14 - S234 of the Massachusetts Institute of Technology \$2.60. Copies on microfilm of miscellaneous papers, consisting of the following items of this present bibliography: Items 1,2,3,5,7,10,11,12,20,23,32,33, and 98.
31. PERRY, J.W. and others. Machine literature searching. New York, Interscience Publishers Inc., 1956, 162pp, 32/-. Chapter 15, "A look into the future" pp.123-134 contains a section on "Machine translation and code dictionary".
32. PERRY, J.W. Machine translation of Russian technical literature: Notes on preliminary experiments, 1952, 16pp, mimeographed plus appendix, no price.
33. PERRY, J.W. Machine translation of Russian technical literature: Notes on exploitation of Russian grammar, 1952, 11pp, mimeographed, no price.
34. PYKE, M. Automation: its purpose and future. Hutchinson, 1956, 191pp, 16/-. Chapter 11, entitled "Automatic translation" pp.149-157.
35. REIFLER, E. The mechanical determination of the constituents of German substantive composita. University of Washington, 1952, 27pp, no price (Studies in Mechanical Translation, No.7).
36. REIFLER, E. Mechanical translation, University of Washington, 1950, 51pp, no price (Studies in Mechanical Translation, No.1).
37. REIFLER, E. Report on the First Conference on Mechanical Translation, June 17-20, 1952. University of Washington, 1952, 22pp, no price. (Studies in Mechanical Translation, No.5).
38. REIFLER, E. Report on research results for summer quarter, 1952. University of Washington, 1952, 7pp, no price (Studies in Mechanical Translation No.6).
39. REIFLER, E. The mechanical translation form-class filtering system. University of Washington, 1952, 20pp, no price (Studies in Mechanical Translation, No.8).
40. REIFLER, E. Some problems of the mechanical translation of languages. University of Washington, 1951, 18pp, no price (Studies in Mechanical Translation, No.2).
41. SAVORY, T.H. The art of translation, Jonathan Cape, 1957, 159pp, 16s. Section dealing with translating machines, pp.149-152.

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42. STIBITZ, G.R. and LARRIVEE, J.A. Mathematics and computers. McGraw Hill, 1957, 228pp, 37/6. Section 11.7 deals with mechanical translation by computers.
43. STREHL, R. The robots are among us. New York, Arco Publishers, 1955, 316pp, \$2. Machine translation is discussed on pp.34-39.
44. U.N.E.S.C.O. Scientific and technical translating and other aspects of the language problem. Paris, 1957, 282pp, 20s. (Documentation and Terminology of Science Series) Section 2.7, "Translating by machine", pages 55-62.
45. WEAVER, W. Translation. July 15th, 1949, 12pp, mimeographed, no price. The historic memorandum circulated privately to 200 acquaintances which gave much of the impetus to research into the possibility of translating machines. This paper is reprinted in full on pp.15-23 of "Machine Translation of Languages" (Item 25 above).
46. WUNDHEILER, L.N. Invariant syntax as prerequisite of all translation. May, 1953, 13pp, mimeographed, no price.
47. YNGVE, V.H. Mechanical translation: quarterly progress report, Research Laboratory of Electronics, Massachusetts Institute of Technology, 1953.

PERIODICAL ARTICLES

48. BAR-HILLEL, Y. Can translation be mechanised? AMERICAN SCIENTIST, April 1954, 48-65 (Reprinted in METHODS, 7, No.25-26, 1955, 45-62).
49. BAR-HILLEL, Y. Mechanical translation. COMPUTERS AND AUTOMATION, 2, No.5, 1953, 1-6.
50. BAR-HILLEL, Y. Report on the present state of research on mechanical translation. AMERICAN DOCUMENTATION, 2, 1951, 229-237. Summary of work done in 1951.
51. BAR-HILLEL, Y. A quasi-arithmetical notation for syntactic description. LANGUAGE, 29, No.1, 1953, 47-58.
52. BAR-HILLEL, Y. Some linguistic problems connected with machine translation. PHILOSOPHY OF SCIENCE, 20, July 1953, 217-225.
53. BASTIN, E.V. General mathematical problems involved in mechanical translation. MECHANICAL TRANSLATION, 3, No.1, 1956, 6-7. Abstract of a paper delivered at a conference of the Cambridge Language Research Group at King's College, 2-4 August 1955.
54. BEFUDDLED. Article in NEWSWEEK, 47, January 2nd, 1956, 56.

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55. BERKOV, V.P. and ERSHOV, B.A. Concerning attempts at machine translation. VOPROSY JAZYKOZNAIJA, November-December, 1955, 145-148. Report and criticism of the I.B.M. Georgetown experiment. (In Russian).
56. BIG BRAIN reads Russian. MACHINE DESIGN, 26, March 1954, 204.
57. BILINGUAL MACHINE. Article in NEWSWEEK, 43, January 18th, 1954, 83.
58. BLISS, W.H. and RVEDY, J.E. An electron tube for high-speed teleprinting. R.C.A. REVIEW, 16, No.1, March 1955, 5.
59. BOOTH, A.D. Calculating machines and mechanical translation. DISCOVERY, 15, April 1954, 280-285. Survey of work done in the United Kingdom and the United States.
60. BOOTH, A.D. Mechanical translation. ASLIB PROCEEDINGS, 9, June 1957. 177-181. Based on a lecture given at an ASLIB Discussion Course, London, 19-20 February, 1957.
61. BOOTH, A.D. Mechanical translation. COMPUTERS AND AUTOMATION, 2, No.4, 1953, 6-8.
62. BOOTH, A.D. Nature of a translating machine. ENGINEERING, 182, September 7th, 1956, 302-304. Paper read before Section G of the British Association at Sheffield, September 4th, 1956. Short bibliography included.
63. BOOTH, A.D. Report of experiments at Birkbeck College scanning characters by means of a projected image. COMPUTERS AND AUTOMATION 4, No.2, 1955, 9.
64. BOOTH, A.D. Use of a computing machine as a mechanical dictionary. NATURE, 176, September 17th, 1955, 565.
65. BRANDWOOD, L. The mechanical dictionary. BABEL, 2, No.3, 1956, 111-118.
66. BRONOWSKI, J. Theory and philosophy of language. MECHANICAL TRANSLATION, 3, No.1, 1956, 12-13. Abstract of a paper delivered at the conference of the Cambridge Language Research Group at King's College, 2-4 August, 1955.
67. CLEAVE, J.P. Braille transcription and mechanical translation. MECHANICAL TRANSLATION, 2, No.3, December 1955, 50-53.
68. CLEAVE, J.P. and ZACHAROV, B. Language translation by electronics: novel application of digital computing machines. WIRELESS WORLD, 61, September 1955, 433-435. The authors, two research workers at the Birkbeck College Electronic Computation Laboratory, describe the experiments carried out there.

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9. **CROSSLAND, R.A.** Graphic linguistics and its terminology. **MECHANICAL TRANSLATION**, 3, No.1, 1956, 8-11. Abstract of a paper delivered at the conference of the Cambridge Language Research Group at King's College, 2-4 August 1955.
10. **DOSTERT, L.E.** and others. The I.B.M. 701 Computer as a translator. **COMPUTERS AND AUTOMATION**, 3, February 1954, 54-67. Report of experimental translations from Russian to English involving 60 sentences, 6 grammatical rules and a 250 word vocabulary.
11. **ELECTRONIC BRAIN TRANSLATES RUSSIAN:** The I.B.M. 701 Computer. **CHEMICAL AND ENGINEERING NEWS**, 32, January 25th, 1954, 340-341.
12. **ELECTRIC BRAIN** translates Russian sentences into English. **POPULAR MECHANICS**, 101, March 1954. 107.
13. **ELECTRONIC INTERPRETER.** Article in **DISCOVERY**, 14, 1953, 202.
14. **ELECTRONIC TRANSLATOR.** Article in **TIME**, 63, January 18th 1954, 82-84.
15. **ELECTRONIC TRANSLATION:** 701 Computer of International Business Machines Corporation. **FRANKLIN INSTITUTE JOURNAL**, 257, March 1954, 257-260.
16. **GODE, A.** The signal system in interlingua - a factor in mechanical translation. **MECHANICAL TRANSLATION**, 2, No.3, December 1955, 55-60.
17. **HARPER, K.E.** The mechanical translation of Russian: preliminary report. **MODERN LANGUAGE FORUM**, 38, No.3-4, September-December 1953, 12-29. A revised version of this report forms section four, pages 66-85, of "Machine Translation of Languages" (Item 25 above).
18. **HARPER, K.E.** Translating Russian by machine. **JOURNAL OF COMMUNICATION**, 5, No.2, Summer 1955, 41-46.
19. **HOLMSTROM, J.E.** Language problem of science. **RESEARCH**, 7, 1954, 190-195. Points out the limitations imposed on the swift interchange of scientific discoveries by the language barrier.
20. **INTERNATIONAL FEDERATION OF TRANSLATORS.** Machine translating, a special number of **BABEL**, 2, No.3, October 1956, containing articles by Yngve, Cary, Booth, Brandwood and Heberden.
21. **KAPLAN, A.** An experimental study of ambiguity and context. **MECHANICAL TRANSLATION**, 2, No.2, November 1955, 39-46.
22. **KAPLAN, A.** Can translation be mechanised? **JOURNAL OF SYMBOLIC LOGIC**, 20, June 1955, 192-194. Critique of the article of the same title by Y. Bar-Hillel (Item 48 above).

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83. KING, G.W. and others. Photographic techniques for information storage. INSTITUTE OF RADIO ENGINEERS: PROCEEDINGS, 41, October 1953, 134-140.
84. LANGUAGE TRANSLATION by electronic brain. SCIENCE NEWS LETTER, 65, January 23rd, 1954, 59.
85. LARSEN, E. Polyglot in the basement. NEW STATESMAN, 52, August 18th, 1956, 183-184.
86. LINGUA EX MACHINA. Article in INDUSTRIAL AND ENGINEERING CHEMISTRY, December 1952, Supplement 11A - 13A.
87. LITERATURE TRANSLATION: scientific papers and scientific language. NATURE, 177, January 7th, 1956, 1-2. Reviews the possibilities of mechanical translation.
88. LOCKE, W.N. Translation by machine. SCIENTIFIC AMERICAN, 194, January 1956, 29-33. Summary of progress to date and of the problems yet to be solved. Discussion of this article appears in SCIENTIFIC AMERICAN, 194, March 1956, 6 - 8.
89. LOCKE, W.N. Speech typewriters and translating machines. P.M.L.A. (MODERN LANGUAGE ASSOCIATION OF AMERICA PUBLICATIONS) 70, April 1955, 23-32.
90. MACDONALD, N. Language translation by machine: a report of the first successful trial. COMPUTERS AND AUTOMATION, 3, February 1954, 6 - 10.
91. MACHINE TRANSLATION. Article in TECHNOLOGY REVIEW, 57, March 1955, 232.
92. MASTERMAN, M. New techniques for analysing sentence patterns. MECHANICAL TRANSLATION, 3, No.1, 1956, 4-6. Abstract of a paper delivered at the conference of the Cambridge Language Research Group at King's College, 2-4 August, 1955.
93. MIND OVER MACHINE: mechanical translator. COLLIER'S, 133, August 1953, 102.
94. MOORE, W.J.M. Applications of computers to industry. ENGINEERING JOURNAL, 37, September 1954, 1068-1072. All possible uses are given, including translating from Russian.
95. MUKHIN, I.S. Experiments on the machine translation of languages carried out on the B.E.S.M. machine. INSTITUTE OF ELECTRICAL ENGINEERS: JOURNAL, 2, November 1956, 677-678. Abstract of a paper read at the Convention on Digital Computer Techniques held on April 9th-14th, 1956 at the Institute of Electrical Engineers. Includes flow sheets and diagrams.

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96. OETTINGER, A.G. The distribution of word length in technical Russian. MECHANICAL TRANSLATION, 1, No.3, December 1954, 38-40.
97. ORNSTEIN, J. Mechanical translation: new challenge to communication. SCIENCE, 122, October 21st 1955, 745-748. Illustrated with a flow chart of processes involved.
98. OSWALD, V.A. and FLETCHER, S.L. Proposals for the mechanical resolution of German syntax patterns. MODERN LANGUAGE FORUM, 36, No.3-4, 1951, 1-24.
99. OSWALD, V.A. and LAWSON, R.H. An idioglossary for mechanical translation. MODERN LANGUAGE FORUM, 38, No.3-4, 1953, 1-11.
100. PARKER-RHODES, A.F. An electronic computer programme for translating Chinese into English. MECHANICAL TRANSLATION, 3, No.1, 1956, 14-19. Paper delivered at the conference of the Cambridge Language Research Group at King's College, 2-4 August, 1955.
101. PERRY, J.W. Translation of Russian technical literature by machine: notes on preliminary experiments. MECHANICAL TRANSLATION, 2, No.1, 1955, 15-24.
102. POLYGLOT BRAINCHILD: calculating machine adapted to translating: the I.B.M. and Georgetown University Institute of Languages and Linguistics. CHEMICAL WEEK, 74, January 30th, 1954, 46-49. A full report of these experiments, by L.M. Dostert, forms section eight of the "Machine Translation of Languages", pages 124-135 (Item 25 above).
103. PREDICT BOOKS translated by machine. SCIENCE DIGEST, 32, November 1952, 79.
104. REIFLER, E. Report on the first Conference on Mechanical Translation. MECHANICAL TRANSLATION, 1, No.2, 1954, 23-32.
105. REIFLER, E. Mechanical determination of the constituents of German substantive compounds. MECHANICAL TRANSLATION, 2, No.1, 1955, 3-14.
106. RESEARCH in progress. MECHANICAL TRANSLATION, 1, No.2, 1954, 33-34. Lists 14 projects in progress at that date.
107. REYNOLDS, A.C. Conference on Mechanical Translation. MECHANICAL TRANSLATION, 1, No.3, 1954, 47-55.
108. RICHENS, R.H. Programming for mechanical translation. MECHANICAL TRANSLATION, 3, No.1, 1956, 20-28. Paper presented at the conference of the Cambridge Language Research Group at King's College, 2-4 August, 1955.
109. RUSSIAN translated into English by electronic computer in a few seconds. ELECTRICAL ENGINEERING, 73, March 1954, 287-288.

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110. SCHWEISHEDMER, W. Language translation by electronic computer. MECHANICAL WORLD, 135, December 1955, 534-535.
111. SENTENCE FOR SENTENCE translator being studied. SCIENCE NEWS LETTER, 70, October 13th, 1956, 232.
112. SHEPARD, D.H. and HEASLY, C.C. Photoelectric reader feeds business machines. ELECTRONICS, 28, May 1955, 134.
113. SHERIDAN, P. Research in language translation on the I.B.M. Type 701, INTERNATIONAL BUSINESS MACHINES: APPLIED SCIENCE DIVISION TECHNICAL NEWS LETTER, 9, January, 1955, 5-24.
114. STOUT, T.M. Computing machines for language translation. MECHANICAL TRANSLATION, 1, No.3, 154, 41-46.
115. STOUT, T.M. Computing machines for language translation. TREND IN ENGINEERING AT THE UNIVERSITY OF WASHINGTON, 6, No.3, July 1954, 11-16.
116. TAUBE, M. and HEILPRIN, L.B. Automatic dictionaries for machine translation. Research paper in Mechanization of Data Retrieval, STUDIES IN COORDINATE INDEXING, 4, June 1957, published by Documentation Incorporated, Washington, U.S.A.
117. TEACH ELECTRONIC BRAIN to find word meanings. SCIENCE NEWS LETTER, 68, October 1st, 1955, 217.
118. TRANSLATING MACHINES. Article in DISCOVERY, 17, 1956, 456.
119. TRANSLATING MACHINE. Article in SCHOLASTIC, 63, January 20th, 1954, 14.
120. TRANSLATING MACHINES? Article in SCIENTIFIC AMERICAN, 181, December 1949, 30.
121. WALL, R.E. Language translating machines seem possible soon. MACHINE DESIGN, 28, July 12th 1956, 5. Report of a speech made to the Summer Meeting of the American Institute of Electrical Engineers.
122. WALL, R.E. Some of the engineering aspects of the machine translation of language. AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS: TRANSACTIONS, 75 Part 1, 1956, 580-585.
123. YNGVE, V.H. The machine and the man. MECHANICAL TRANSLATION, 1, No. 2, 1954, 20-22.
124. YNGVE, V.H. Machines for the translation of languages. JOURNAL OF COMMUNICATION, 5, No.2, Summer 1955, 35-40.
125. YNGVE, V.H. Sentence for sentence translation. MECHANICAL TRANSLATION, 2, No 2, 1955, 29-37.

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126. YNGVE, V.H. The technical feasibility of translating languages by machine. AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS: TRANSACTIONS, 75 Part 1, 1957, 792-797.

PAPERS PRESENTED AT THE CONFERENCE ON DOCUMENTATION, held in 1956 at Western Reserve University.

127. LOCKE, W.N. Language and machines, 5pp.
128. PERRY, J.V. Invitational meeting on machine translation: report of proceedings, 10pp.

The above two papers are reprinted in the following work:

129. SHERA, J.H. and others. Documentation in action. Chapman and Hall, 1956, 471pp, 80/-, pages 313-317 and 365-374 respectively.